NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

STREAMBANK AND SHORELINE PROTECTION
(Ft)
CODE 580

DEFINITION

Using vegetation or structures to stabilize and protect banks of streams, lakes, estuaries, or excavated channels against scour and erosion.

SCOPE

This standard applies to measures used to stabilize and protect the banks of streams, lakes, estuaries, and excavated channels. It does not apply to erosion problems on main ocean fronts and similar areas of complexity not normally within the scope of NRCS authority or expertise. All revetments, bulkheads, or groins are to be no higher than 3 ft. above mean high tide or, or in nontidal areas, no higher than 3 ft. above mean high water.

PURPOSE

To stabilize or protect banks of streams, lakes, estuaries, or excavated channels for one or more of the following purposes:

1. To prevent the loss of land or damage to utilities, roads, buildings, or other facilities adjacent to the banks,
2. To maintain the capacity of the channel,
3. To control channel meander that would adversely affect downstream facilities,
4. To reduce sediment loads causing downstream damages and pollution, or
5. To improve the stream for recreation or as a habitat for fish and wildlife.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to natural or excavated channels where the streambanks are susceptible to erosion from the action of water, ice, or debris, or damage from livestock or vehicular traffic. It also applies to controlling erosion on shorelines where the problem can be solved with relatively simple structural measures, vegetation, or upland erosion control practices and where failure of structural measures will not create a hazard to life or result in serious damage to property.

DESIGN CRITERIA

Because each reach of a channel, lake, or estuary is unique, measures for streambank and shore protection must be installed according to a plan and adapted to the specific site.

Streambank protection design. Designs for streambanks shall be according to the following principles:

1. Protective measures to be applied shall be compatible with improvements planned or being carried out by others.
2. The grade must be controlled, either by natural or artificial means, before any permanent type of bank protection can be considered feasible, unless the protection can be safely and economically constructed to a depth well below the anticipated lowest depth of bottom scour.
3. Streambank protection shall be started at a stabilized or controlled point and ended at a stabilized or controlled point on the stream.
4. Needed channel clearing to remove stumps, fallen trees, debris, and bars that force the streamflow into the streambank shall be an initial element of the work.
5. Changes in channel alignment shall be made only after an evaluation of the effect on the land use, interdependent water disposal systems, hydraulic characteristics, and existing structures.
6. Structural measures must be effective for the design flow and be able to withstand greater floods without serious damage. They shall also be designed to avoid an increase in erosion downstream of planned measures.
7. Vegetative protection shall be considered on the upper parts of eroding banks, especially

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on areas that are susceptible to infrequent inundation.

8. Vegetative measures will be considered first. See Critical Area Planting standard 342 for guidelines. Erosion that cannot be controlled by vegetative measures should then be considered for structural measures along with vegetative measures. In some cases, the lower part of the streambank can be stabilized with riprap or other structural measure, and the upper part of the bank can be adequately protected by vegetation.
9. The combination of structural and vegetative measures shall provide erosion protection commensurate with the hazard involved and the property to be protected. Where agricultural land is being protected, the minimum design flow is a 5-year frequency flow. For other property, the minimum design flow is a 10-year frequency flow. Larger design flows shall be used where appropriate.
10. The combination of structural and vegetative measures shall provide erosion protection up to the design frequency flow line, or to the top of bank, whichever is lower.
11. Structural measures shall be set at stable bottom elevations and protected against undercutting.
12. Riprap rock size, gradation and cross section shall conform to the requirements of Minnesota Technical Release No. 3, "Loose Riprap Protection."

Streambank protection measures. The following is a partial list of elements that may be included in a plan for streambank protection.

- —Removal of fallen trees, stumps, debris, minor ledge outcroppings, and sand and gravel bars that may cause local current turbulence and deflection.
- —Removal of trees and brush that adversely affect the growth of desirable bank vegetation.
- —Reduction of the slope of streambanks to provide a suitable condition for vegetative protection or for the installation of structural bank protection.
- —Placed or dumped heavy stone, properly underlaid with a filter blanket, if necessary, to provide armor protection for streambanks.
- —Deflectors constructed of posts, piling, fencing, rock, brush, or the materials that project into the stream to protect banks at curves and reaches subjected to impingement by high velocity currents.
- —Pervious or impervious structures built on or parallel to the stream to prevent scouring streamflow velocities adjacent to the streambank.
- —Artificial obstructions, such as fences, to protect vegetation needed for streambank protection or to protect critical areas from damage from stock trails or vehicular traffic.
- —Establishment of suitable vegetation, normally done in conjunction with other work such as bank sloping or structural work.

Shoreline protection design. Designs for shoreline protection shall be according to the following principles:

1. Treatment depends on soil type and the slope characteristics both above and below the waterline. Slope characteristics below the waterline shall be representative of the slope for a minimum of 50 ft (15 m) distance from the shore.
2. End sections shall be adequately bonded to existing measures or terminate in stable areas.
3. Design water surface shall be mean high tide or in nontidal areas the mean high water.
4. Control of surface runoff and internal drainage shall be considered in the design and installation of all shore protection measures.
5. For revetments, the height of protection shall be determined by procedures outlined in Minnesota Technical Release No. 2, "Flexible Slope Protection for Dams and Lakeshores."
6. Structural measures shall be set on firm foundations at stable bottom elevations and protected against undercutting.
7. Vegetative protection measures should be designed in accordance with SCS Technical Release No. 56, "A Guide for Design and Layout of Vegetative Wave Protection for Earth Embankment Dams" and Critical Area Planting Standard 342.

Shoreline protection measures. The following is a partial list of protection measures that may be used.

- —Bulkheads (timber, concrete, concrete block).
- —Revetments (prefabricated slope protection blocks, riprap, soil cement).
- —Groin systems (timber or concrete).
- —Vegetation of the type that will grow across or along the waterline.

Fish and wildlife. Special attention shall be given to maintaining or improving habitat for fish and wildlife.

Landscape resources. Considerations shall be given to the use of construction materials, grading practices, vegetation, and other site development elements that minimize visual impacts and maintain or complement existing landscape uses such as pedestrian paths, climate controls, buffers, etc.

Permits. All required permits shall be obtained before the measure is installed.

PLANS AND SPECIFICATIONS

Plans and specifications for streambank and shoreline protection shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.